REMARKS

Present Status of the Application

The Office Action rejected all pending Claims 1-16. Specifically, Claims 1-4 were rejected under 35 U.S.C. 102(b) as being anticipated by Shimada et al (US 4,161,645), and Claims 5-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al.

In response thereto, Applicants have amended Claims 1-4 by incorporating the feature of Claims 5-6, canceled Claims 5-6, amended Claims 7-12, and submitted the following remarks. Applicants have also added new Claims 17-18 that are supported by paragraphs **[0025]** and **[0040]** of the specification, respectively. Reconsideration of Claims 1-4 and 7-16 and consideration of new Claims 17-18 are respectfully requested.

Discussion of Rejections to Claims 1-4 under 35 U.S.C 102(b)

Claims 1-4 were rejected under 35 U.S.C. 102(b) as being anticipated by Shimada et al (hereinafter as Shimada). Please note that Applicants have amended Claims 1-4 by adding the feature of original Claim 5/6 into them. Therefore, Applicants respectfully request withdrawal of the rejections to Claims 1-4 under 35 U.S.C. 102(b).

Discussions of Rejections to Claims 5-16 under 35 USC 103(a) and New Claims 17-18

Claims 5-16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada. Please note that Applicants have amended Claims 1-4 by adding the feature of original Claim 5/6, canceled Claims 5-6, amended Claims 7-12 and added new claims 17-18. Hence, the non-obviousness of amended independent Claims 1-4 are discussed below.

According to §706.02(j) of MPEP, to establish a *prima facie* case of obviousness, three basic criteria must be met. **First**, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a reasonable expectation of success. **Finally**, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Applicants respectfully submit that one feature of Claims 1-4, the concentration of the oxidative gas ranging from 2000 vol. ppm to 6000 vol. ppm, does not meet the above three basic criteria of obviousness judgment for the reasons set forth.

First, according to col. 4, lines 7-9 of Shimada: "*carbon dioxide gas, or a mixture of carbon dioxide and oxygen or other inert gas, is also supplied as a shielding gas 7*", the shielding gas (= 2nd shielding gas of Claims 1-4) is itself an oxidative gas when it is a CO_2 gas or a CO_2-O_2 mixture (CO_2 is deemed as an oxidative gas in this invention, **[0026]**), or is a gas mixture containing an oxidative gas when it is a mixture of CO_2 and other inert gas. According to the context and the general notation of a mixture, CO_2 that is written firstly is the ***main component*** of Shimada's

shielding gas, and one of ordinary skill in the art would naturally consider that Shimada teaches to set the concentration of the oxidative gas (CO_2 or CO_2+O_2) in the shielding gas to tens percent at least.

However, there is merely a ***trace amount*** of oxidative gas in the second shielding gas of this invention. The concentration of oxidative gas in the second shielding gas of Claims 1-4 is merely 0.2-0.6% (2000-6000 vol. ppm), which is significantly smaller than tens percent by about two orders of magnitude. Since the difference in the oxidative gas concentration is so large, there is no suggestion or motivation, either in Shimada or the knowledge generally available to one of ordinary skill in the art, to modify the oxidative gas concentration of Shimada's shielding gas to such a low level of Claims 1-4. That is, routine experimentation based on the suggestion or motivation from Shimada or the combination of Shimada with the general knowledge in the art cannot cover the scope of Claims 1-4.

Second, since the concentration of oxidative gas in the second shielding gas of Claims 1-4 is significantly smaller than that in Shimada by about two orders of magnitude, there is no reasonable expectation of success for this invention to one of ordinary skill in view of Shimada. More importantly, according to FIG. 9 of this invention, the concentration range of 2000-6000 vol. ppm is surely ***critical*** to the depth of the welded metal portion 5a, which is an important parameter for the welding effect according to paragraph **[0003]**. As described in §2144.05 of MPEP, II-A (Optimization within prior art conditions or through routine experimentation): generally, differences in concentration or temperature will not support the patentability of subject matter

encompassed by the prior art *unless there is evidence indicating such* ***concentration*** *or temperature is critical.*

Finally, based on the above analyses, Shimada or its combination with the knowledge generally available to one of ordinary skill in the art does not teach or suggest all the claim limitations, because at least the above limitation of *a concentration of the oxidative gas ranging from 2000 vol. ppm to 6000 vol. ppm* is not taught or suggested by it.

For at least the above reasons, Applicants respectfully submit that amended independent Claims 1-4 patently define over the prior art.

For at least the same reasons mentioned above, Applicants respectfully submit that Claims 7-16 and new Claims 17-18 dependent directly or indirectly from Claims 1-4 also patently define over the prior art.

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CONCLUSION

For at least the foregoing reasons, it is believed that pending Claims 1-4 and 7-16 and new Claims 17-18 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
J.C. PATENTS

Date: 11/29/2005

Jiawei Huang
Registration No. 43,330

4 Venture, Suite 250
Irvine, CA 92618
Tel.: (949) 660-0761
Fax: (949)-660-0809